

RADIATION

(INCLUDING LASERS, MICROWAVE OVENS AND UV TANNING EQUIPMENT)

RADIATION

INTRODUCTION

Radiation hazards arise from the use of both ionising and non-ionising radiation in the workplace. Possible health effects may range from hereditary effects and carcinogenesis to eye, skin and tissue damage.

Ionising radiation means gamma rays, x-rays etc., which directly or indirectly are capable of producing ions (charged particles). Over exposure to such radiation can be extremely damaging to health. Activities involving ionising radiation are therefore subject to the Ionising Radiation Regulations 1999 (IRR). Most of these activities will arise in situations where HSE is the enforcing authority. Most of the administrative aspects of the provisions will also be administered by HSE. Local authorities' only involvement will be at premises allocated to them for enforcement.

Safety issues involving non-ionising radiation include those arising from the use of lasers, microwaves, UV tanning equipment and other sources of U/V radiation exposure (e.g. tungsten halogen lights).

IONISING RADIATION

In the local authority-enforced sector the IRR 1999 will apply to the following activities:

- (a) Luminising watch repairs.
- (b) Sale or storage for sale of articles containing radioactive substances (Requirements of particular importance or relevance may include storage (Reg. 29), designated controlled areas (Reg. 16) and accounting for the quantities involved (Reg. 28)).
- (c) Installation in a building of articles containing radioactive substances (e.g. certain smoke detectors and self-luminous signs). Contamination problems may arise following their destruction in a fire.
- (d) Use of articles containing radioactive substances (e.g. anti-static devices which may be found in some offices or photographic shops).
- (e) X-ray inspection apparatus - which may be found in post offices for example.
- (f) Site radiography.

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NON-IONISING RADIATION

1. LASERS

Biological hazards from lasers depend on the wavelength, the power or energy of the beam, the pulse length and the exposure duration. The largest risk is that of damage to the eye (including blindness) although burns to the skin are also possible. There is also a potential fire hazard with high power lasers.

There are four classes of laser product from Class 1 (inherently safe or safe by engineering design) up to Class 4 (most hazardous). Firms using laser products in excess of Class 2 should appoint a Laser Safety Officer (LSO) with competency to advise on precautions that may be necessary. Appropriate warning signs/labels should also be displayed, showing the class of laser and simple precautionary advice.

Safety advice/precautions include:

Class 1 Laser Products - (e.g. supermarket checkout laser scanners):

- Proper maintenance, including interlocks and security of panels.
- Use only of authorised service personnel, following appropriate precautions to avoid exposing any person to harmful radiation levels.
- Warning labels.

Class 2 Laser Products

- Precautions to prevent continuous view of the direct beam.
- Where reasonably practicable, laser beams should be terminated at the end of their useful paths and should not be aimed at personnel (especially at head height)

Class 3B & 4 Laser Products (eg. used for display purposes)

- The operator of the laser system should provide the proprietor/employer etc. with sufficient information to demonstrate it can be used safely.
- Minimisation of the emission of invisible and visible radiation.
- All equipment to be rigidly mounted.
- Use of non-flammable beam stops.
- Supervision by competent person.
- Control against unauthorised use.
- Demarcation of laser display areas.
- Secure and appropriate siting of laser control console.
- Emergency cut-off.
- Laser radiation exposure levels to be determined in advance at all appropriate positions.
- Marking of area boundaries.
- Precautions in setting up and aligning laser systems.
- Functional checks prior to public operation.

2. **MICROWAVE OVENS**

The incidence rate to date for injuries (such as thermal tissue damage) arising at microwave ovens from exposure to microwave radiation appears minimal. Lack of cleanliness and poor maintenance of door seals can lead to leakage in excess of the recommended limit of 5 mW/cm². Maintenance or service contracts with manufacturers or suppliers are to be recommended.

3. **UV TANNING EQUIPMENT**

The use of UV tanning equipment may expose staff and customers to UV radiation at levels that can cause injuries and ill health, either in the short-term (e.g. sunburnt skin, conjunctivitis) or in the long-term (e.g. skin cancer and cataracts).

Operators of equipment need to assess the risks from the use of UV equipment and take steps to control the risks so far as is reasonably practicable. Safety issues that require consideration should include:

Information or advice from manufacturers or suppliers.

Nature and extent of risks.

Systems of work to avoid unnecessary exposure of employees to UV and safe use of equipment by customers.

Advice to customers and the provision of personal protective equipment (e.g. goggles).

Training of staff.

Maintenance, personnel and customers' records.

Cautionary/advisory notices.

4. **TUNGSTEN HALOGEN LIGHTS**

Desktop lighting systems using unfiltered tungsten halogen bulbs, under certain exposure conditions, can emit unacceptably high levels of UV radiation (UVR). It is generally recommended therefore that all tungsten halogen lamps should either be fitted with an appropriate UVR filter or a bulb with a glass outer element. In particular, the use of unfiltered desktop lamps should be discouraged if they are used for more than 2 hours per day and are sited within 0.6 metres of the user.

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CHECKLIST - RADIATION

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|---|-----|----|
| 1. Do you have work activities that involve sources of ionising or non-ionising radiation? | YES | NO |
| 2. If so, have you carried out an assessment of the risk involved and taken appropriate steps to reduce such risks so far as is reasonably practicable? | YES | NO |
| 3. Have you established safe working procedures relating to any potential radiation hazard? | YES | NO |
| 4. Have you trained relevant personnel in the hazards and precautions involved (and logged the training)? | YES | NO |

REFERENCES/FURTHER DETAILS

- *1. Approved Code of Practice No. 16 - The protection of persons against ionising radiation arising from any work activity - (HSE) - ISBN 0-11-883838-5
- *2. HELA - LAC 42/2 - The Ionising Radiation Regulations 1985
- *3. HELA - LAC 60/2 - Laser product safety
www.hse.gov.uk/lau/lacs/60-2.htm
- *4. HELA - LAC 60/3 - Microwave Ovens - Exposure Control
www.hse.gov.uk/lau/lacs/60-3.htm
- *5. HELA - LAC 60/4 - Radiation hazards from lasers used for display purposes www.hse.gov.uk/lau/lacs/60-4.htm
- *6. HELA - LAC 60/5 - The use of lasers at checkout counters in retail premises www.hse.gov.uk/lau/lacs/60-5.htm
- *7. HELA - LAC 60/6 - UV radiation exposure from tungsten halogen light sources www.hse.gov.uk/lau/lacs/60-6.htm
- *8. Leaflet IND(G)209 - Controlling the health risks from the use of UV tanning equipment - HSE.
www.hse.gov.uk/pubns/indg209.pdf
- *9. HS(G)95 : Radiation Safety of Lasers Used for Display Purposes ISBN 0-7176-0691-0 (HSE)
- *10. Guidance Note PM19 - Use of Lasers for Display Purposes (HSE)
- *11. Leaflet IND(G)224 L - Controlling Safety of Display Laser Installations.(HSE).

* Available to view by prior arrangement at Nuneaton and Bedworth Borough Council, Environmental Health Services, Council House, Coton Road, Nuneaton. CV11 5AA

** Free copy available from Nuneaton and Bedworth Borough Council at the above address.

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